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The Development of Hydrological Services

Bruce Stewart
President of the
WMO Commission for Hydrology

International Symposium on PWS: A key to Service Delivery, Geneva, 3-5 December 2007

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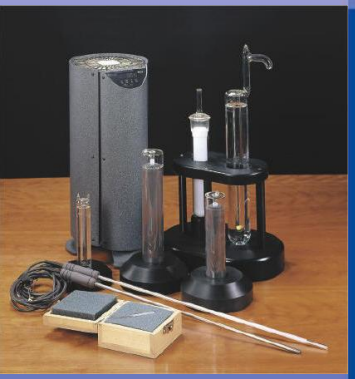
Outline.



- Mission/Functions of HSs
- Developments
  - The focus and operations of HSs
  - The economics of water management
  - Modelling capabilities
  - Monitoring/information collection framework
  - Deliver services
- Relationships between HSs and NMSs

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The Mission of HSs

To provide reliable, impartial, timely information that is needed to manage the water resources of the country, including:

- minimising the loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement;
- effectively managing ground-water and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses;
- protecting and enhancing water resources for human health, aquatic health, and environmental quality; and
- contributing to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

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Functions of a HS.

- National repository of and authority on long-term time series of hydrological information (quantity and quality);
- Measurement, collection and storage of hydrological data;
- Access to/dissemination of hydrological data
- access to/dissemination of relevant metadata;
- Information/products that indicate the present and future state of the freshwater resources;
- Analysis of the yield potential of river systems, a reservoir site or aquifer (or combinations of the above);
- Analysis of the water quality characteristics of river and aquifer systems;

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Functions of a HS (Cont.).

- Analysis of water quality implications of land use changes and pollutions incidents;
- Analysis of the environmental flow requirements of river and aquifer systems;
- Forecasts and warnings of both high (floods) and low (droughts) flows;
- Design hydrological information for the construction and operation of hydrological structures (dams, bridges, culverts, etc.); and
- General advice on hydrological issues.

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Sustainable water resources management.

Infrastructure

Entitlements

Pricing

Good water information is the key

Trading

Planning

Management

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The water information value ladder.

Data >>> Information >>> Insight

>>> Increasing value >>>

Forecasting

Reporting

Analysis

Integration

Distribution

Aggregation

Quality assurance

Collation

Monitoring

Done poorly

Done poorly to well

Generally done well, by over 100 groups, but could be vastly improved with new technology

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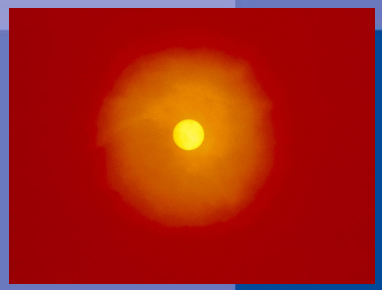
The focus and operations of HSs.



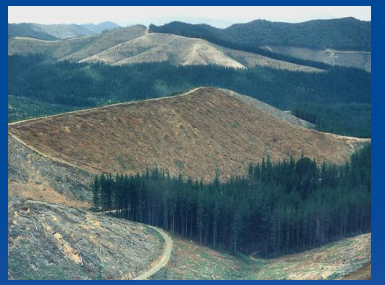
Drying & Warming Climate

Growing Urban Demand

Over-allocation to Irrigation

Uncapped Groundwater Extraction

Current Drivers



Expanding Plantations

Expanding Farm Dams

The Environmental Flows Imperative

Bushfire Recovery Impacts

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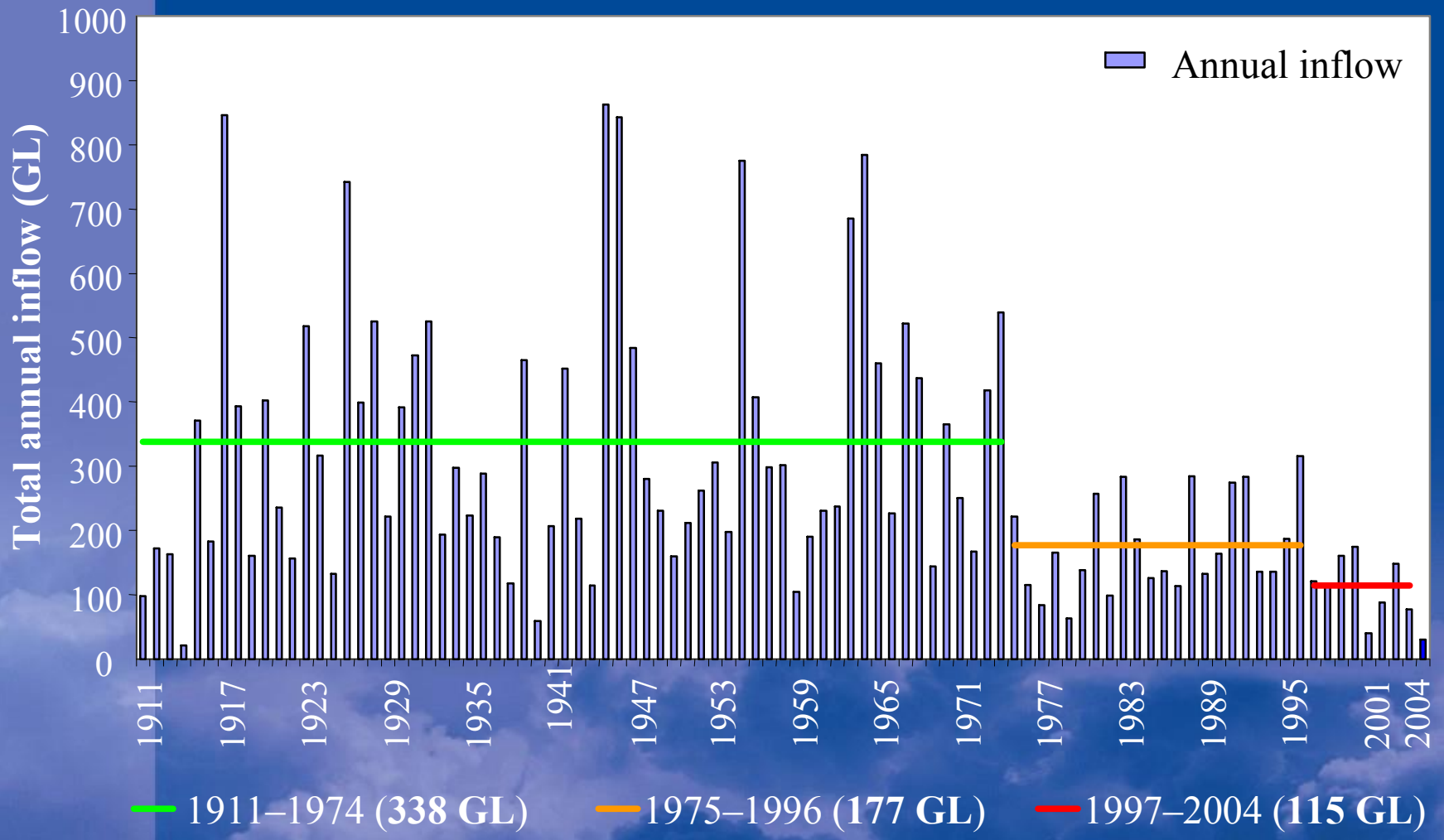
Declining annual inflows to Perth's dams.



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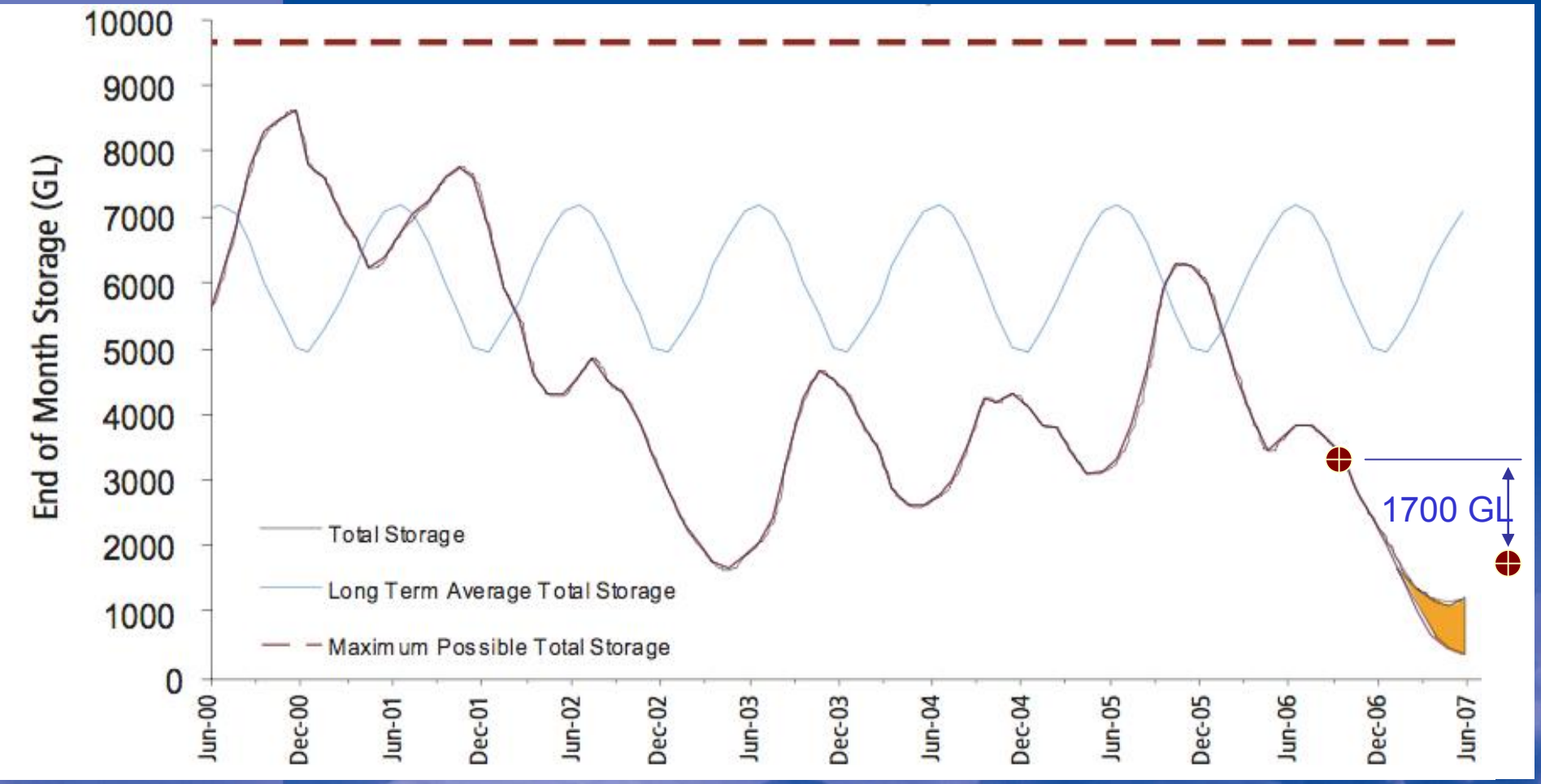
Water storage volumes in the MDB system.



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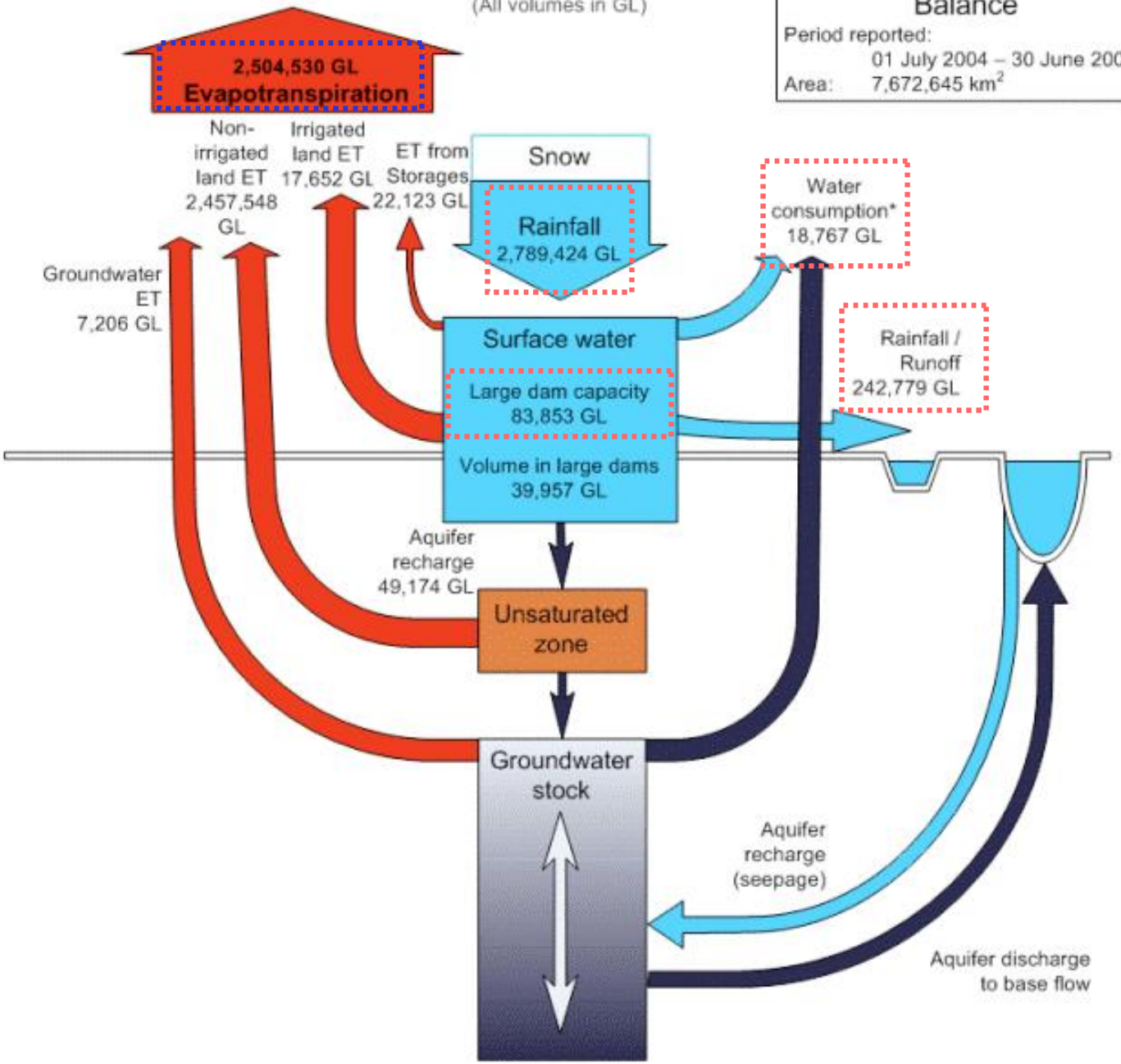
Water Cycle Report

(All volumes in GL)

Australia National Water Balance

Period reported: 01 July 2004 – 30 June 2005

Area: 7,672,645 km^2



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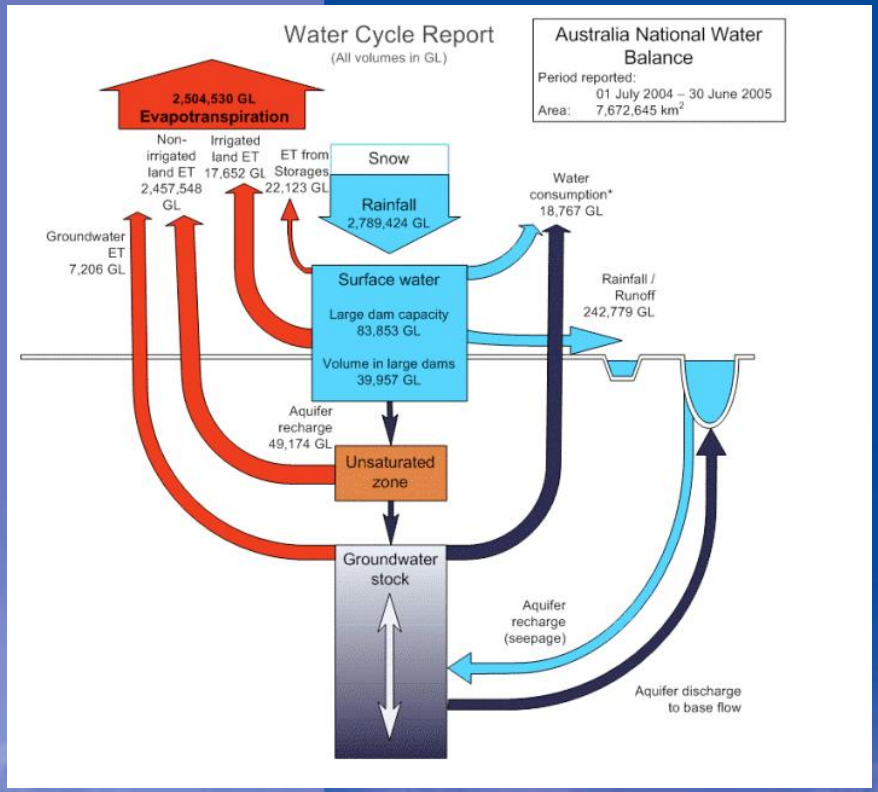
A national water account.



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- Entitlements
- Allocation announcements
- Trades
- Carry-forwards

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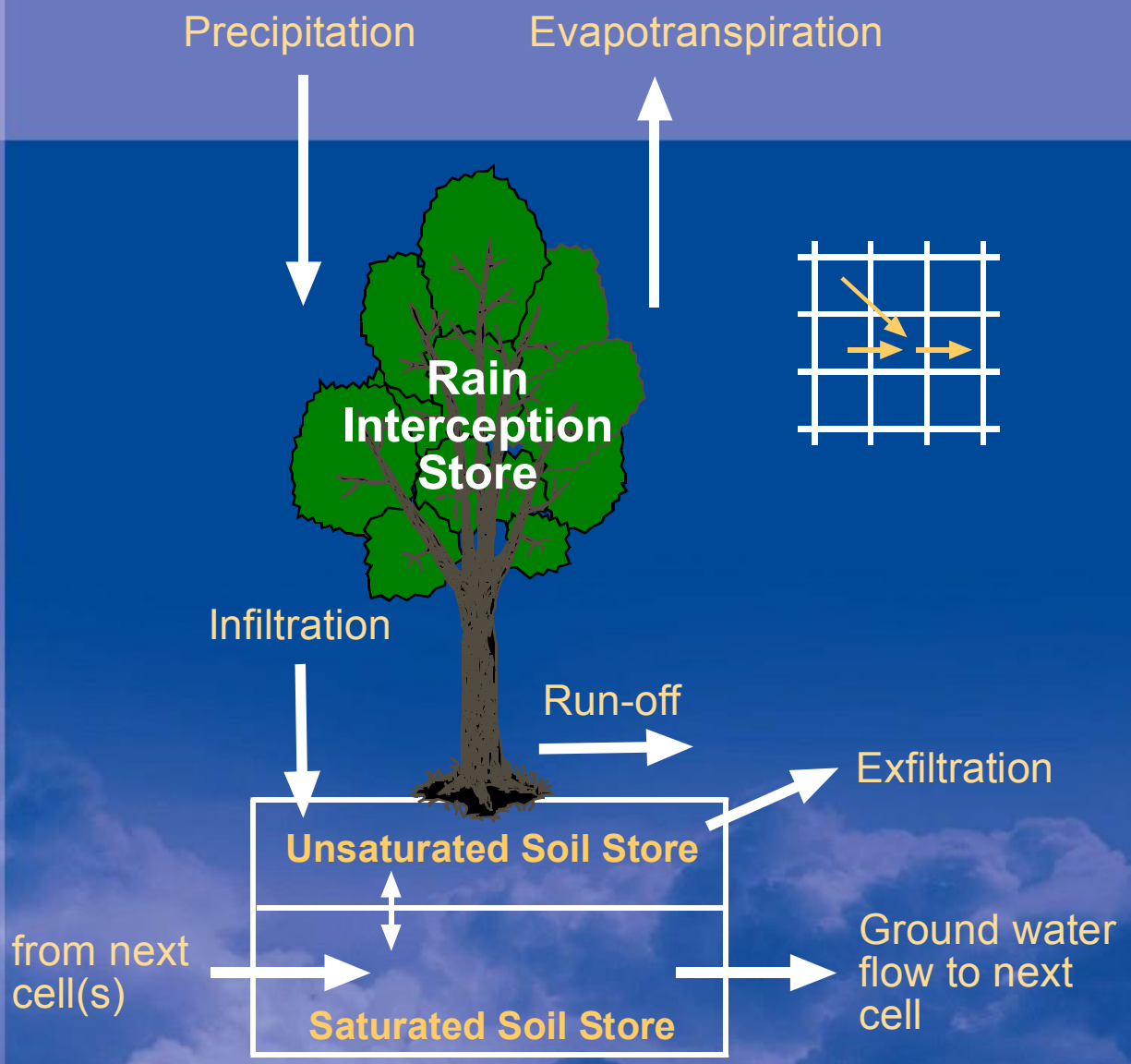
The Hydrological Model



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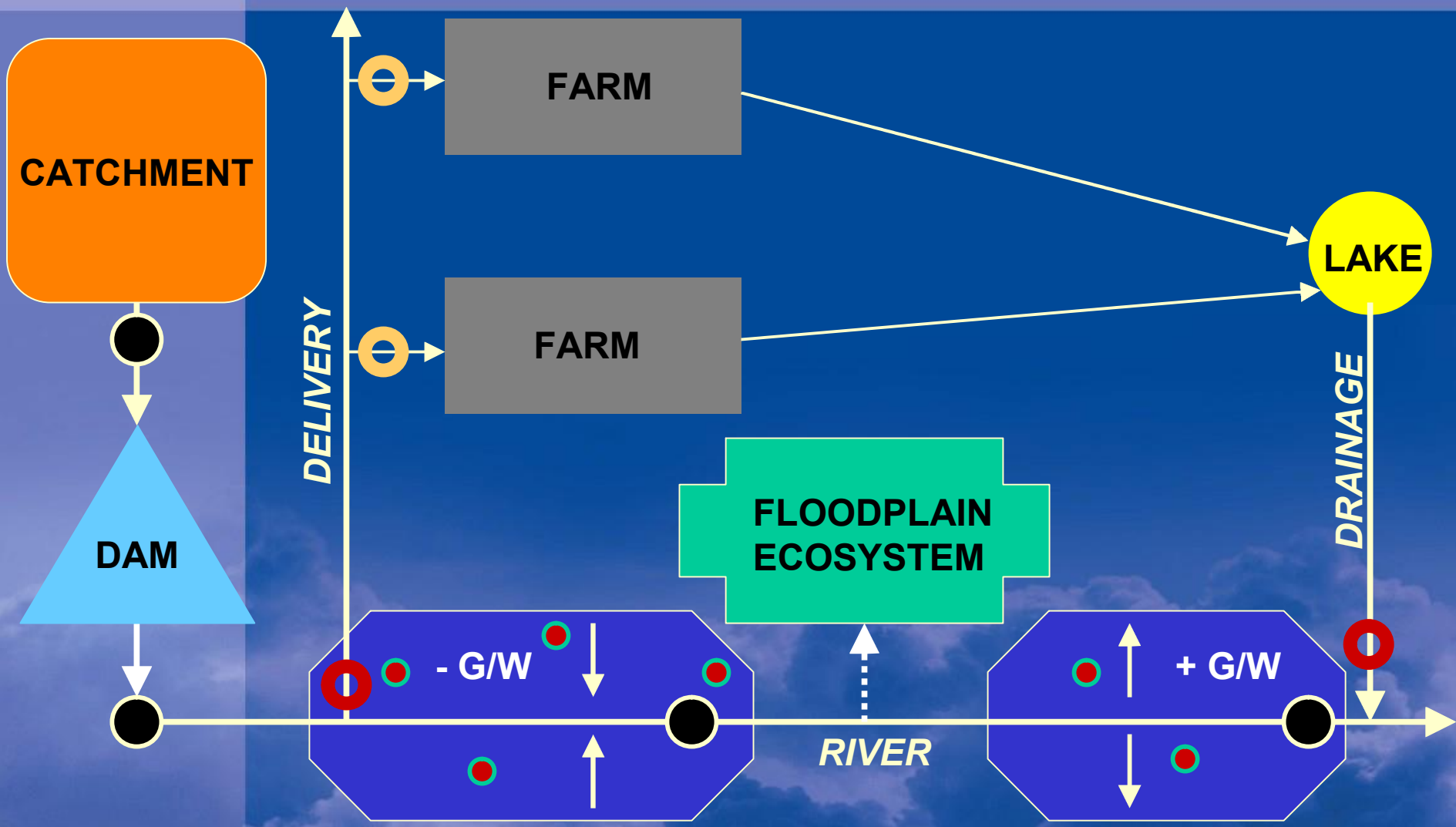
Some water fluxes in an irrigation area.



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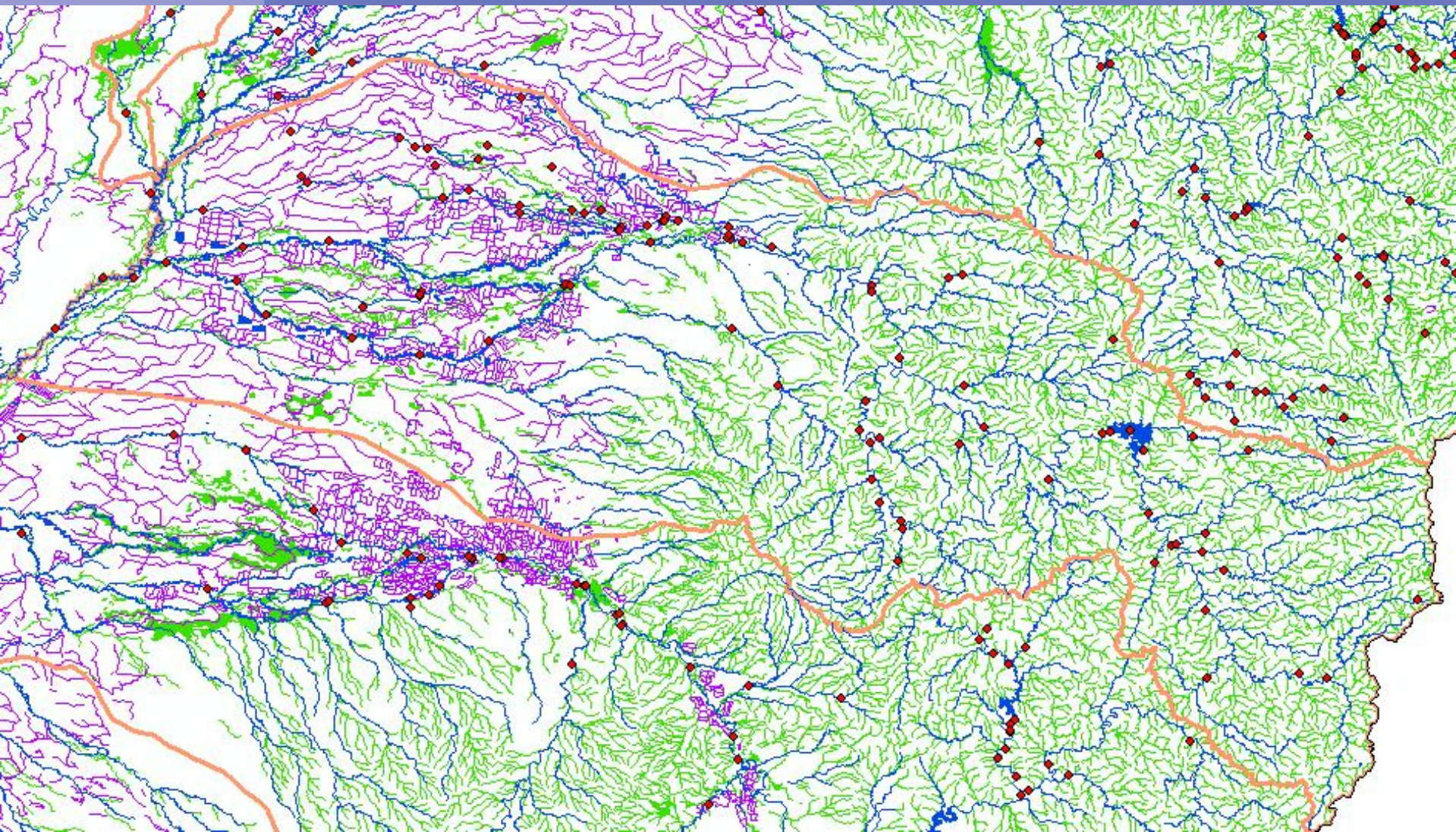
Subset of the Gwydir catchment, NSW.



Tasmanian Water Use Management Project

This project involves the installation of 3000 Ajenti telemetry systems to be fitted to water meters throughout the state.

Better statewide water management and resource planning.

Improved management of on-farm water use.

- Increased productivity
- Increased efficiency
- Increased profitability

Internet

Trade

Ajenti telemetry system

Ajenti telemetry system

Facilitates water trading through accurate measurement of water transfer and use.

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National Water Commission

Hydro Tasmania Consulting

Technical Improvements

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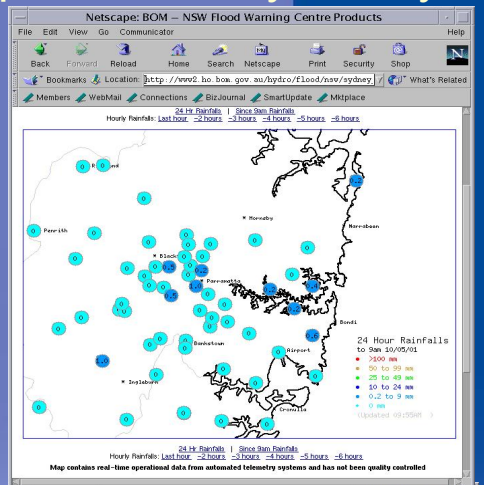
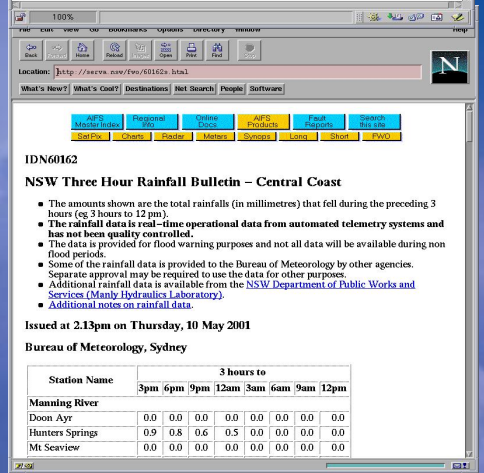
Web Products

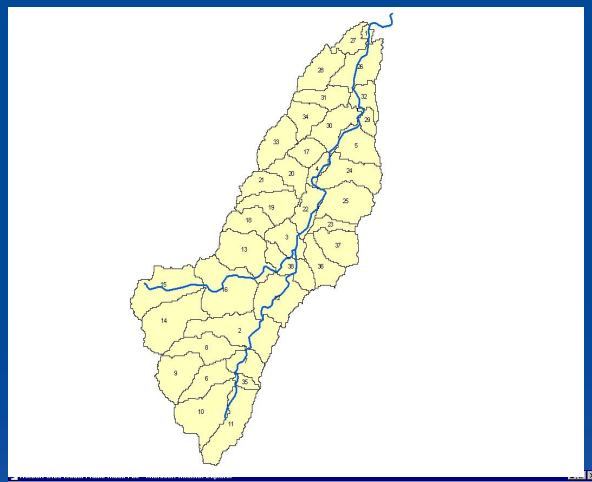
Maps and data bulletins
Updated hourly – daily

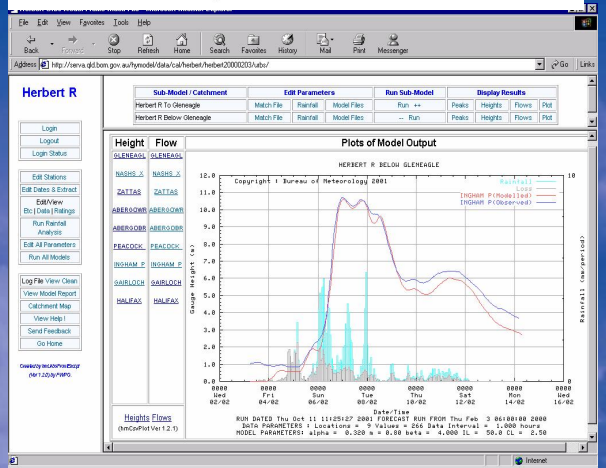




Modelling

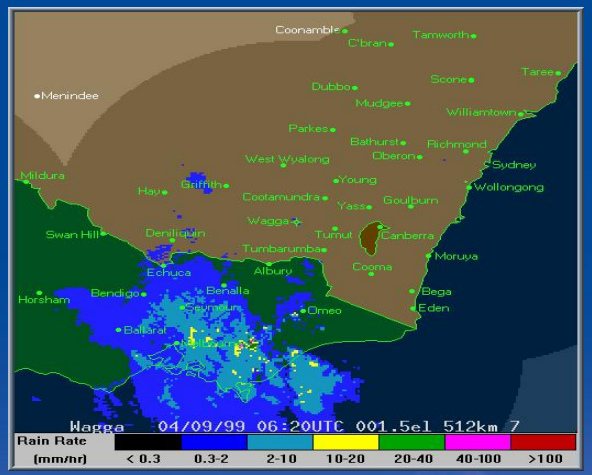
Spatially distributed, event-based
National system - scaleable

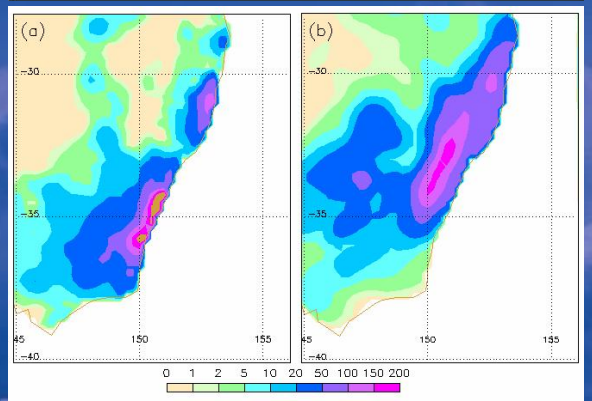




Hydromet Inputs

•Quantitative radar rain
•NWP, QPF





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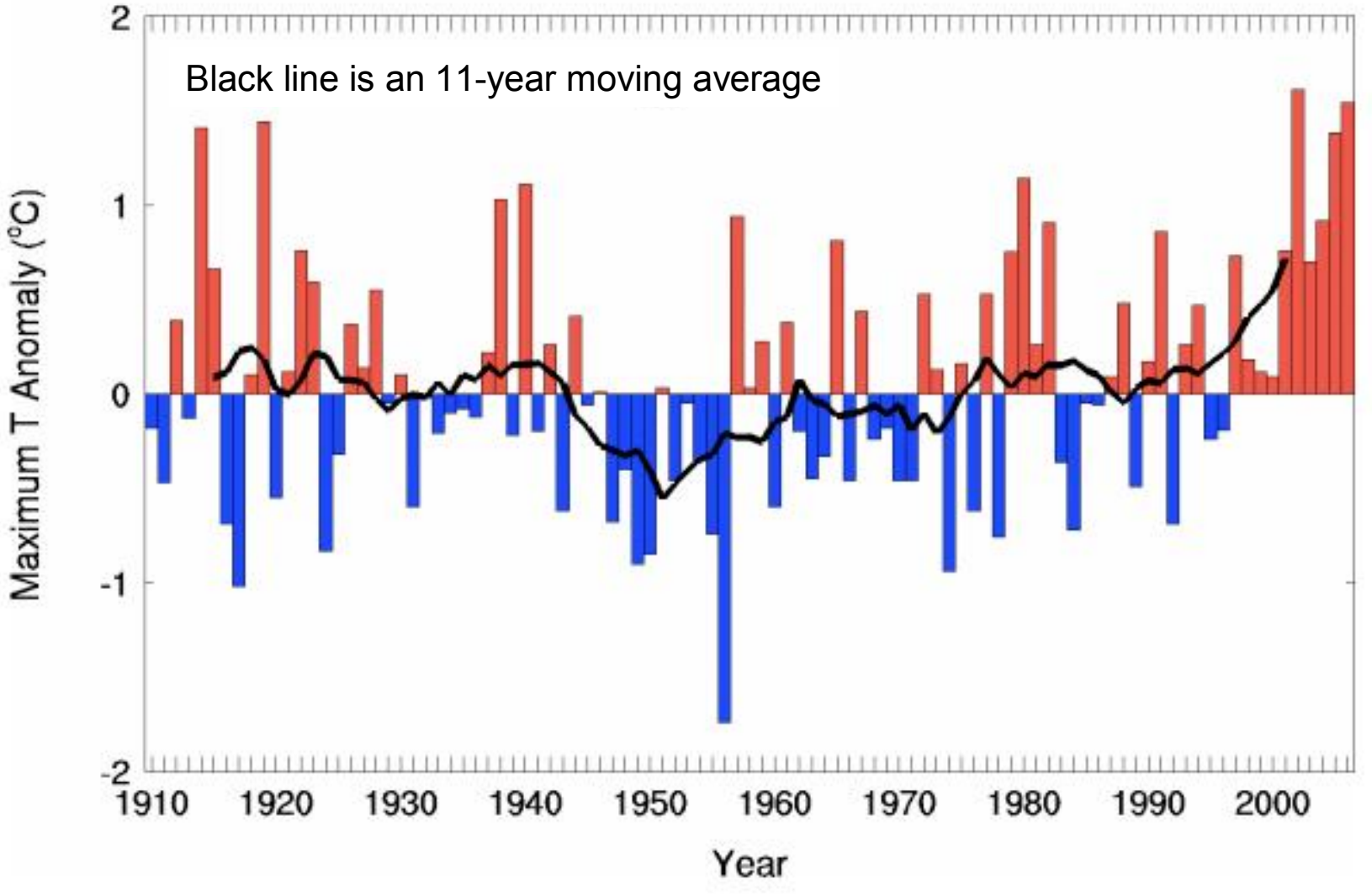
Temperature anomaly in the MDB system (versus 1961-1990 base)



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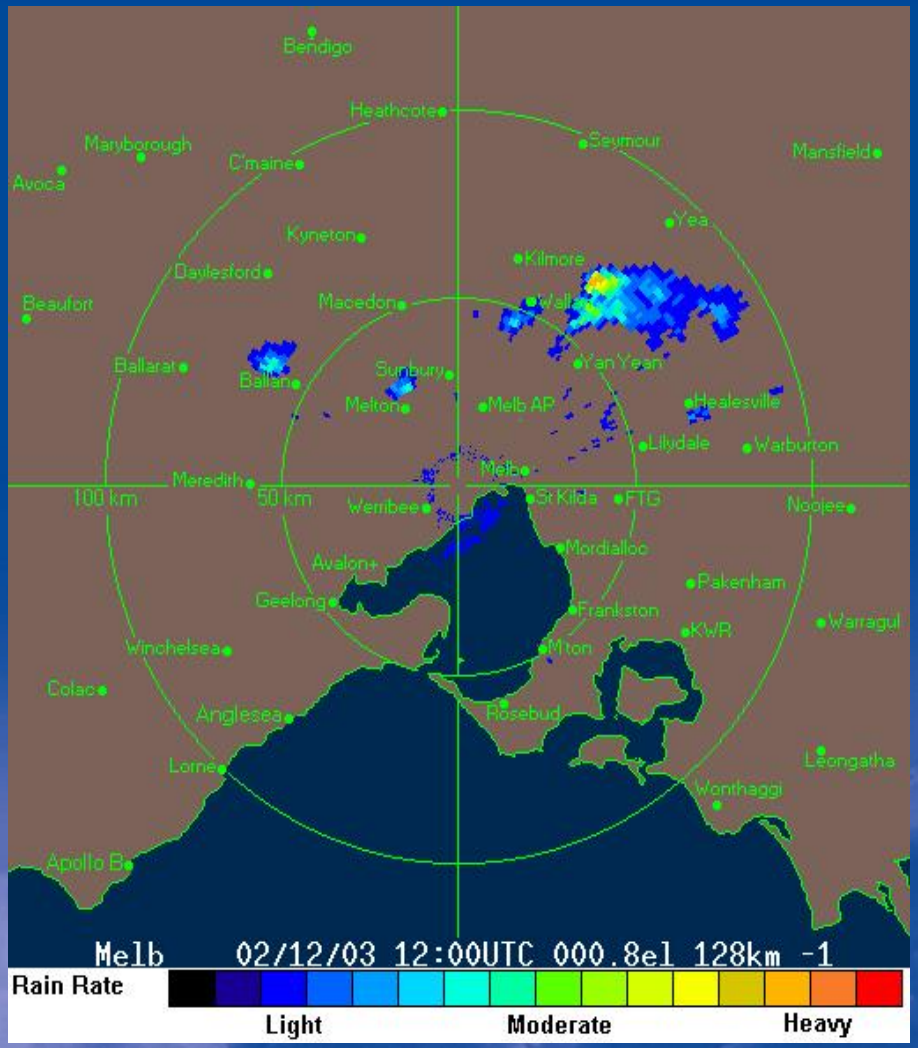
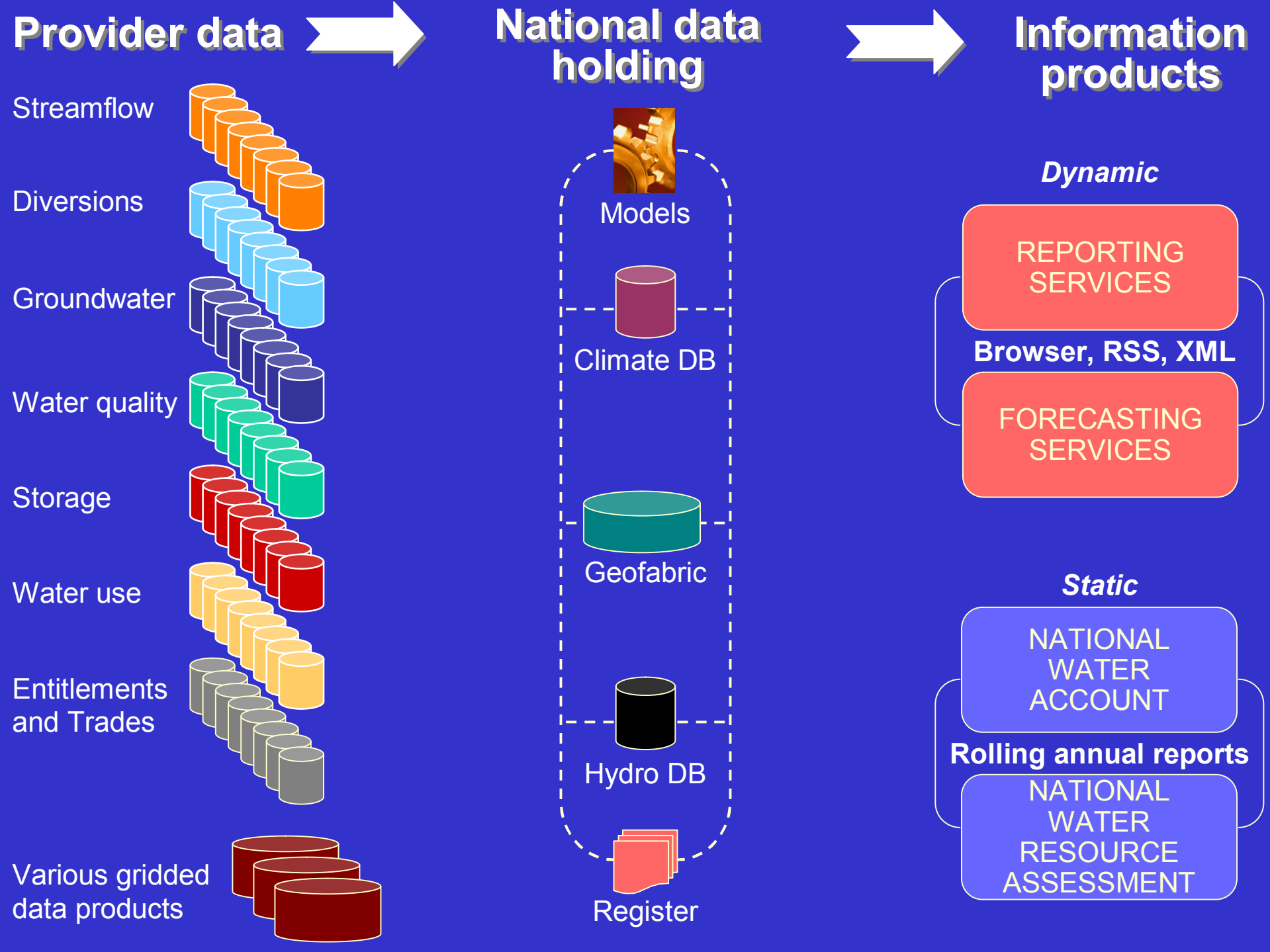
USE OF RADAR BASED RAINFALL




Provider data
National data holding
Information products
Streamflow
Diversions
Groundwater
Water quality
Storage
Water use
Entitlements and Trades
Various gridded data products
Models
Climate DB
Geofabric
Hydro DB
Register
Dynamic
REPORTING SERVICES
Browser, RSS, XML
FORECASTING SERVICES
Static
NATIONAL WATER ACCOUNT
Rolling annual reports
NATIONAL WATER RESOURCE ASSESSMENT

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Contact.

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